

other common species noted, of which no record was unfortunately kept. On the pastures *Adkinia coprodactyla* was observed, and no doubt the country would be well-worth working seriously. Already in Wheeler's *Butts. of Switzerland* several good species are recorded from Einsiedeln, and certainly there is much to be done there. Our collectors who know all there is to know of the lateral branches of the Rhone Valley, and are interested in working new ground, and would like a change, might do much worse than spend a few days on the "bogs" between Wädenswil and Einsiedeln.

Myrmecophilous Notes for 1908.

By H. St. J. K. DONISTHORPE, F.Z.S., F.E.S.

FORMICIDÆ.—*Formica rufa*, L.—In September I found a nest of this species at Nethy Bridge, Invernessshire, which contained a large proportion of pseudogynes. This shows that *Atemeles pubicollis*, Bris., a species of coleoptera new to Britain, is to be found in Scotland. I also found pseudogynes in another nest in quite a different part of the forests at Nethy Bridge. This is the first record in Britain of pseudogynes of *F. rufa*. I shall, if possible, go to Nethy Bridge next spring to hunt for the *Atemeles*, as in the winter it would be in *Myrmica* nests.

Formica sanguinea, Ltr.—In May I found pseudogynes in plenty in a nest of this species in the New Forest. This shows that *Lomechusa strumosa* is to be found in the New Forest. It was the first time that pseudogynes of this ant had been taken in Britain.

Formica fusca, Ltr.—On October 25th I observed a specimen of this ant carrying an *Aphis* to its nest at Luccombe Chine, I. of W. I captured both, the *Aphis* was in no way hurt. This spot, by the way, is the only one in the I. of Wight where I know *F. fusca* to occur (though, no doubt it does occur in other parts of the island), *F. rufibarbis* var. *fusco-rufibarbis* being the form I have always found at Sandown and other places.

Formica rufibarbis, F.—When at Bewdley, in May, I found a fine nest of this species, all the ants being a very bright red. The nest was partly under a stone and partly built up in the bank. Mr. Arnold has taken this form at Ripley.

Formica rufibarbis var. *fusco-rufibarbis*, For.—My friend, Mr. Keys, of Plymouth, sent me the contents of some nests of this variety from his district, in which some of the pupæ were naked, as in *Myrmica* species. When at Sandown, I. of W., I found a nest of *fusco-rufibarbis*, which also contained naked pupæ, as well as pupæ in cocoons.

When digging at Luccombe Chine, on October 28th, many dealated ♀s of *Lasius*, sp. (*niger* or *flavus*) were dug up in the little cells they had formed, and with eggs, the nucleus, if successful, of future colonies. The ♀ is nine months without food, bringing up the first batch of ♂s. In one instance a couple of ♀s were found together in the same cell with a batch of eggs, and I pointed them out to my companions, Professor Beare and Mr. J. Taylor. On this subject Professor Wheeler writes*—" . . . attention has been repeatedly called

* "On the Founding of Colonies by Queen Ants," *Bull. American Mus. Nat. Hist.*, vol. xxii., 1906, p. 41.

to the fact that an ant colony is started by a single isolated female. This requires some qualification, since, under very exceptional circumstances, a couple of females from the same maternal nest may meet after their marriage flight and together start a colony. During August, 1904, I found two dealated females of *Lasius brevicornis* occupying a small cavity under a clump of moss on a large boulder near Colebrook, Connecticut. They had a few larvæ and small cocoons and a couple of tiny callow workers. . . . Without doubt these twin females were sisters that had accidentally met under the same bit of moss and had renewed the friendly relations in which they had lived before taking their nuptial flight. This case is of considerable interest because, as a rule, even sister ants seem averse to such post-nuptial partnerships."

Tapinoma erraticum, Ltr.—Several nests were found in the New Forest in May. They contained two or three dealated ♀s, but no beetles or other guests were found in them.

Leptothorax nylanderii, Först.—A small nest of this little ant was found in a broken bough on an ash-tree at Ryde, I. of W., in September. The ants were occupying the burrows of *Priobium castaneum*.

Solenopsis fugax, Ltr.—A fair number of specimens of this small species was found at Blackgang Chine in August. They were at the roots of *Arenaria maritima*, some alone and others with *Lasius niger* and *flavus*.

MYRMECOCHORUS SEEDS.—In a very interesting paper* on the "Dispersal of Seeds by Ants," Professor F. E. Weiss calls attention to the fact that ants may be of considerable importance in the dispersal of plants. He regards it from a botanist's rather than a zoologist's point of view, but in any case the subject is of great interest and will bear further investigation. All true myrmecochorus seeds provide a food largely of an oily nature, which attracts the ants. At Darent Wood I observed ants from a nest of *Lasius fuliginosus* carrying seeds, unfortunately those I collected were lost; but on July 21st I made a small collection of seeds from a nest of *F. rufa* at Chattenden. The seeds were obtained by taking them from the ants as they arrived at their nests with them. Professor Weiss has kindly named them for me.

Iola, sp?—Several seeds. These are true myrmecochorus seeds and possess an appendage, the elaiosome, which contains the supply of oil sought after by ants.

Carduus sp.?—A thistle down. "Several species of thistle are provided with an elaiosome at the base of the style just inside the plume, so that when the latter breaks away, the food-body is exposed in the form of what French writers have called the 'mamelon.' This contains a plentiful supply of oil." Other seeds taken from the ants were—*Arrhenatherum arenaceum*, false oat-grass, *Holcus lanatus*, soft-grass, and a flower of the scarlet pimpernel. As these do not supply any food it is difficult to suggest for what purpose the ants carry them into the nest.

COLEOPTERA.—*Dinarda dentata*, Gr., and *Lomechusa strumosa*, F.,

* "The Dispersal of Fruits and Seeds by Ants" (*The New Phytologist*, vol. vii., no. 1, 1908.

were bred in my *F. sanguinea* observation nest in some numbers in the beginning of the year, January to May.

Myrmedonia humeralis, Gr.—When staying with my friend, Mr. Willoughby Ellis, at Knowle, in May, this beetle was observed in the greatest profusion in the Haye Woods. Though, of course, it is common and widely-distributed, and everyone who has investigated ants' nests has found it, still I have never seen it before in anything like the numbers it occurred here. Near one large nest a cart-track went through the wood, and in this track the *Myrmedonia* occurred in every crack and under every dead leaf, and also many of its larva. Every here and there little heaps of dead ants were to be found, and these kept being added to by the *Myrmedonias* with specimens they had slain. The beetles could be seen hiding and pouncing on a solitary ant. Thousands of the ants must have been killed in this way. I made some notes on June 2nd of an ant in captivity killed by a *Myrmedonia*. The latter started the attack at 10 a.m., and at 11.55 it had bitten the ant's head off and taken it into a corner to be devoured. It bit at the ant all over, and when the ant was roused it always poked the tail into the ant's face. When other *Myrmedonias* tried to join in, it pushed them off with its tail. This specimen was a ♀, as a ♂ tried to copulate with it at 11.15. This it did not allow, but I was able to observe the copulation in other couples. Copulation takes place in the same way as I described* in *Lomechusa*, that is, the ♂ does not get on the back of the ♀, but bends the tail over the body and head to reach the end of the tail of the ♀.

I had hoped to solve, with the help of Mr. Grosvenor, of the Oxford Museum, the problem I have been working at for a good many years now, namely, what is the chemical formula of the substance given off by *Myrmedonia* to protect itself from the ants? We took some of the beetles round to all the chemists at the Museum, but they were none of them able to recognise what the very strong pungent smell is that *Myrmedonia* excretes. Altogether our experiments can only be described as negative, chiefly on account of not having enough beetles with me. (This was a great pity, as at the time I might easily have obtained a very large quantity instead of the 60 or 70 I took away. My friend, Mr. Ellis, seemed to think it would prevent them occurring another year. With this I personally disagree, as when a beetle occurs in such numbers one can make very little difference by a single day's collecting.) Still, it may be as well to record here what they consisted of. A flask containing the beetles, with a tube to let air in, was connected with two large glass test-tubes, in which we tried water, alcohol (dilute and absolute), and cotton-seed oil, for absorbing "smell." A suction pump being fitted to the last tube to draw the air from the "beetle flask" through the two test tubes.

Homolota parallela, Man.—This little species was observed by Professor Beare and myself with *F. rufa* at Nethy Bridge.

Bythinus glabratus, Rye.—Mr. W. H. Bennett captured it this year with its usual ant, *Ponera contracta*.

Coccinella distincta, Fald.—On May 31st, at Bewdley, I pointed out specimens of this "lady-bird" to my friend, Mr. Ellis, which were crawling out of a nest of *Formica rufa*, and we subsequently found a

* *Trans. Ent. Soc. Lond.*, 1907, pt. iv., p. 416.

good number. This is its first record for the Midlands. My present view is that these beetles seek the nests of *Formica rufa* for hibernation, and leave in the spring or early summer.

Dendrophilus pygmaeus, L., and *Monotoma conicicollis*, Aub.—Specimens were found by Professor Beare and myself in *F. rufa* nests at Nethy Bridge, in September.

PEZOMACHIDÆ.—*Pezomachus anthracinus*, Först.—On June 21st I found a number of specimens running about in company with *Lasius niger*, on the Deal sand-hills, and looking very ant-like in appearance.

Pezomachus aquisgranensis var. *neesii*.—I took a specimen in a nest of *Myrmica laevinodis*, at Sandown, I. of W., on August 26th. Morley records the type with *Myrmica ruginodis* and *scabrinodis* in the Bentley Woods, Suffolk.

BRACONIDÆ.—*Chorebus* sp.?—I bred a ♂ (March 17th, 1908) and a ♀ (March 27th, 1908) out of my observation-nest of *F. rufa*.

Apanteles falcatus, Nees.—I bred a small ♀ in my *F. rufa* observation-nest in July. I understand the genus *Apanteles* is parasitic on lepidopterous larvæ, and I have, of course, introduced such larvæ into my nest as food for the ants from time to time.

Acoelius riator, Först.—On September 18th I took a specimen of this rare species in a nest of *Formica rufa* at Nethy Bridge, Inverness-shire. I understand from Mr. Morley that only one other specimen is known, the type, which was taken at Aix-la-Chapelle.

CHALCIDIDÆ.—*Spalangia erythromera*, Först.—The little black *Spalangia* which I have recorded before from *L. fuliginosus* nests at Wellington College, and bred in numbers from my observation-nest of that species, have been named for me by Professor Howard, as above, and confirmed by Father Wasmann, who has taken it with the same ant.

(To be continued.)

The Sale of the Collection of Lepidoptera formed by the late Mr. W. H. E. Thornthwaite.

The death of Mr. Thornthwaite found his collection in a very upset condition. He had recently bought two large Gurney cabinets, whilst another was being built, the collection had been turned into boxes for rearrangement, and everything was upside down. It took a considerable time merely to place the specimens in the cabinets ready for the sale, which took place in "Stevens' sale rooms" on October 27th, and this want of arrangement and the fact that some of the insects were not too well-labelled, all told in producing a comparatively poor financial total. Yet most things that were really good sold well. A pair of *Cyaniris semiargus* from the "Fry coll." went for 26s.; a poor ♂ *Chrysophanus dispar*, 32s. 6d., and a fair ♀, 45s. A *Euranessa antiopa*, with a "Hackney" label, brought 11s., whilst a lot, with a good aberration of *Argynnis adippe*, produced 20s.; and a magnificent specimen of *Enodia hyperanthus* ab. *lanceolata*, with three aberrations of *Epinephele ianira*, produced 50s. These were the best prices for the butterflies. A really beautiful series of *Agrius convolvuli* and two *Hyloicus pinastri* produced 30s.; five *Celerio gallii* (Dr. Gill), a *Hyles euphorbiae*, labelled "Bouchard," and a *Hippotion celerio*, from "Lynmouth," produced 11s. only, whilst three *Phryxus livornica*, one from